



National Aeronautics and
Space Administration



Launch Vehicle: Atlas V-401

Launch Location: Vandenberg Air Force Base, CA

Launch Date: March 2016

NASA's Launch Services Program presents... MarCO

When NASA launches its next mission on the journey to Mars - a stationary lander in 2016 - the flight will include two CubeSats. This will be the first time CubeSats have flown in deep space. If this flyby demonstration is successful, the technology will provide NASA the ability to quickly transmit status information about the main spacecraft as it is landing on Mars.

The twin communications-relay CubeSats, being built by NASA's Jet Propulsion Laboratory, Pasadena, California, constitute a technology demonstration called Mars Cube One (MarCO). CubeSats are a class of spacecraft based on a standardized small size and modular use of off-the-shelf technologies. Many have been made by university students, and dozens have been launched into Earth orbit using extra payload mass available on launches of larger spacecraft.

The basic CubeSat unit is a box roughly 4 inches (10 centimeters) square. Larger CubeSats are multiples of that unit. MarCO's design is a six-unit CubeSat - about the size of a briefcase -- with a stowed size of about 14.4 inches (36.6 centimeters) by 9.5 inches (24.3 centimeters) by 4.6 inches (11.8 centimeters).

MarCO (Mars Cube One) Mission

MarCO will launch in March 2016 from Vandenberg Air Force Base, California, on the same United Launch Alliance Atlas V rocket as NASA's Interior Exploration using Seismic Investigations, Geodesy and Heat Transport (InSight) lander. InSight is NASA's first mission devoted to understanding the interior structure of the Red Planet. MarCO will fly by Mars while InSight is landing, in September 2016.

The two CubeSats will separate from the Atlas V booster after launch and travel along their own trajectories to the Red Planet. After release from the launch vehicle, MarCO's first challenges are to deploy two solar panels, followed by two radio antennas. The high-gain, X-band antenna is a flat panel engineered to direct radio waves the way a parabolic dish antenna does. MarCO will be navigated to Mars independently of the InSight spacecraft, with its own course adjustments on the way.

Ultimately, if the MarCO demonstration mission succeeds, it could allow for a "bring-your-own" communications relay option for use by future Mars missions in the critical few minutes between Martian atmospheric entry and touchdown.

By verifying CubeSats are a viable technology for interplanetary missions, and feasible on a short development timeline, this technology demonstration could lead to many other applications to explore and study our solar system

